

Virum talem preconio eodem dignum esse crediderim, quo populi Americani praeses quidam magnus, professoris nostri in anno primo munus suum ingressus, populi sui a poeta eximio postea est laudatus:—

En vir benigne intentus, fortis, providus,
Sagax patiensque, laudem non culpam timens.¹

On June 17, Lord Rayleigh was formally installed as Chancellor of the University in succession to the late Duke of Devonshire. At a luncheon given by the master and fellows of Gonville and Caius College to the Chancellor, the recipients of honorary degrees, and a large party of guests, Sir Andrew Noble announced that several of Lord Rayleigh's friends, non-resident members of the University, proposed, in order to express the gratification of the scientific world at his election, to offer to the University a fund large enough to provide an annual award to be associated with the name of the Chancellor.

The Harkness scholarship for 1908 has been awarded to T. O. Bosworth, and the Wiltshire prize to W. C. Smith. The John Winbolt prize has been awarded to L. B. Turner, for his essay on "The Elastic Breakdown of Materials submitted to Compound Stress." The examiners were also of opinion that the essay sent in by E. T. Busk was deserving of honourable mention.

The special board for biology and geology has approved a grant of 200l. from the Balfour fund made by the Balfour managers to J. Stanley Gardiner, in aid of researches in the Seychelles, Aldabra, and the neighbouring islands.

The professorship of chemistry is vacant by the resignation of Prof. Liveing. The electors will meet for the purpose of electing a professor on Saturday, July 25. Candidates are requested to communicate with the Vice-Chancellor on or before July 13.

OXFORD.—The Drapers' Company has offered to make a grant of 22,000l. for a new electrical laboratory at the University, and to contribute 1000l. toward its equipment. This generous offer will be brought before Convocation in October.

LIVERPOOL.—The council of the University has instituted two new chairs, one of Celtic studies and the other of mediæval archæology. Prof. Kuno Meyer, who already holds the endowed chair of German in the University, has been appointed to the first of these new chairs, and Mr. F. P. Barnard to the second.

A COURSE of lectures and demonstrations on the scientific study of fisheries has been started this summer session in the University of Aberdeen. It is being conducted by Dr. T. Wemyss Fulton, scientific adviser to the Scottish Fishery Board.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, April 30.—"A Photographic Determination of the Elements of the Orbits of Jupiter's Satellites." By Bryan **Cooke**. Communicated by H. F. Newall, F.R.S.

During the opposition of Jupiter in 1902, the author was engaged in making a series of measurements of the relative positions of the four Galilean satellites with the 7-inch heliometer at the Cape Observatory. Simultaneously with these visual observations, photographs were taken with the astrographic telescope. This paper contains a short account of the work done in connection with the photographs; a detailed account has appeared as vol. xii., part iv., of the "Annals of the Cape Observatory."

The investigation with the heliometer was undertaken with the object of determining the mass of Jupiter and correcting the best available elements of the orbits of the satellites, which observation showed were considerably in error.

The mass of the system of Jupiter, in terms of the sun's mass, was determined with great care from the heliometer observations. The value finally deduced is

$$1 : 1047.30 \pm 0.06.$$

¹ (Abraham Lincoln).

"The kindly-earnest, brave, foreseeing man,
Sagacious, patient, dreading praise, not blame."
Lowell's "Commemoration Ode," vi. *ad finem*.

In the case of the second satellite, which has an orbit at an inclination of $0^{\circ}.48$ to Jupiter's equator, the node retrogrades 12° per annum, and of this motion 82 per cent. is due to the compression of Jupiter, 4 per cent. to the influence of satellite I., 13 per cent. to that of III., and 1 per cent. to that of IV.

The fifth satellite discovered by Barnard is so near to the primary that the node of its orbit revolves through about 912° per annum, and second-order terms begin to make themselves felt. A careful measurement of this motion would be of much value, for a comparison of the compression of Jupiter, deduced from the motion of the node of V. with that deduced from the motion of the node of II., might provide information concerning the distribution of mass in Jupiter.

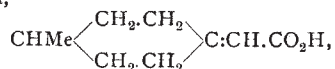
JUNE 4.—"On the Decay of the Radium Emanation when dissolved in Water." By R. B. **Moore**. Communicated by Sir William Ramsay, K.C.B., F.R.S.

The results obtained by Ramsay and Cameron on dissolving radium emanation in water and in copper sulphate solution have made it advisable to investigate the behaviour of the emanation, when dissolved in such solvents, from a radio-active standpoint. The present note deals with the rate of decay of the radium emanation when dissolved in water. The emanation accumulated by 110 milligrams of radium bromide in two days, with the accompanying oxygen and hydrogen, was collected in a gas burette over mercury. After exploding, a small amount of water was run into the burette, and the solution of the emanation thus obtained, together with the slight excess of hydrogen, was transferred to a glass tube 2 inches long and 5 mm. in diameter, which had previously been exhausted. The solution filled about five-sixths the volume of the tube. The latter was sealed, and the decay curve of the emanation was obtained by means of the γ rays, sheet lead being used to cut down the rays to the required amount. The half-time period found was 3.8 days. It may, therefore, be assumed that the emanation decays at the same rate when dissolved in water as it does in air.

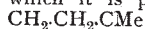
Geological Society, June 3.—Prof. W. J. Sollas, F.R.S., president, in the chair.—The fossiliferous rocks of the southern half of the Tortworth inlier: F. R. **Cowper Reed** and Prof. S. H. **Reynolds**. This paper is a continuation of that on the igneous rocks of this area published in 1901 (Quart. Journ. Geol. Soc., vol. lvi., p. 267). The rocks are affected by the Hercynian flexures which produced the Bristol coal-basin, and the outcrop of the beds in the main follows the horseshoe-shaped outcrop of the Old Red Sandstone. This regularity is lost at Daniel's Wood and Middlemill. Two important transverse faults traverse the outcrops, which are further obscured by the overlap of unconformable Trias. The trap-bands are found to be confined to the Llandovery, the number of recorded fossils has been largely added to, and previous statements as to the thinness and imperfect development of the Ludlow rocks and as to the probable exposure of the district to erosion in Ludlow and Lower Old-Red-Sandstone times are confirmed.

Chemical Society, June 4.—Sir W. Ramsay, K.C.B., F.R.S., president, in the chair.—The interaction of copper and nitric acid in presence of metallic nitrates considered with reference to the existence of hydrates in solution: E. H. **Rennie**, A. J. **Higgin**, and W. T. **Cooke**. The authors consider that the acceleration caused by some nitrates and the retardation induced by others on the dissolution of copper in nitric acid are due to the withdrawal by the salts of water or nitric acid from the solution, and the consequent concentration or dilution of the acid.—The triazo group, part iv., allylazoimide: M. O. **Forster** and H. E. **Fierz**. Allylazoimide prepared in small yield and with some difficulty from allyl chloride and sodium azide is a mobile refractive liquid which boils at $76^{\circ}.5$ under 760 mm. pressure.—Aromatic arsonic and arsenic acids: F. L. **Pyman** and W. C. **Reynolds**. The following new substances are characterised:—bis-2-amino-tolyl-5-arsinic acid, bis-2-acetylaminotolyl-5-arsinic acid, bis-*p*-aminophenylarsinic acid, and bis-*p*-acetylaminophenylarsinic acid.—Condensation products from aminophenenedicarboxylic acid: W. **Godden**.—A delicate test for bromides alone or in solution with chlorides: J. S.

Jamieson. The solution is heated with dilute sulphuric acid and potassium dichromate, shaken with chloroform, and the chloroform layer washed with water two or three times, and finally shaken with dilute potassium iodide. In the presence of a bromide the chloroform is coloured violet. —Experiments on the synthesis of *l*-methylcyclohexylidene-4-acetic acid,



part i.: W. H. **Perkin**, jun., and W. J. **Pope**.—A method for the measurement of rate of change in solid alloys: Preliminary note: G. D. **Bengough**.—Viscosity determinations at high temperatures: C. E. **Fawsitt**.—Dinitrodiphenylamine-*o*-sulphonic acid. Preliminary note: S. **Smiles**.—The study of the absorption spectra of the hydrocarbons isolated from the products of the action of aluminium chloride on naphthalene: Miss A. **Homer** and J. E. **Purvis**. These hydrocarbons (*Trans. Chem. Soc.*, 1907, xci., 1103) have absorption curves which agree with the view that $\text{C}_{14}\text{H}_{16}$ is a naphthalene derivative, whilst $\text{C}_{10}\text{H}_{16}$ has a constitution similar to that of $\beta\beta$ -dinaphthyl, and $\text{C}_{26}\text{H}_{22}$ that of an alkyl derivative of picene, and not of dinaphthantracene, as had been previously suggested. —The synthesis and constitution of certain pyranol salts related to brazilein and hæmatein: W. H. **Perkin**, jun., R. **Robinson**, and (in part) M. R. **Turner**.—Brazilin, hæmatoxylin, and their derivatives, part ix., on brazilin, hæmatin, and their derivatives: P. **Engels**, W. H. **Perkin**, jun., and R. **Robinson**.—The effect of constitution on the optical activity of nitrogen compounds: R. W. **Everatt**.—The electrolytic oxidation of some hydroxybenzoic acids: A. G. **Perkin** and F. M. **Perkin**.—Note on morindin: A. G. **Perkin**. It is suggested that the morindin of *Morinda citrifolia* obtained by Oesterle and Tisza is different from that of *M. umbellata*, since it appears to be different in composition and to yield a different sugar on hydrolysis. —Some esters of arsenious acid: W. R. **Lang**, J. F. **Mackey**, and R. A. **Gortner**. Descriptions of a number of alkyl esters prepared by heating alcohols and phenols in contact with arsenious oxide, using a reflux condenser with a Soxhlet attachment containing anhydrous copper sulphate to remove water formed, are given. — α -Methylcamphor and fenchone: W. H. **Glover**. It is shown that α -methylcamphor and fenchone are essentially different in type, and on this ground exception is taken to Wallach and Semmler's formula for fenchone, which it is proposed should be represented as



follows:—



esterification: A. **Lapworth**.—Experiments on the formation and hydrolysis of esters, acetals, and allied compounds. Preliminary note: E. **Fitzgerald** and A. **Lapworth**.

Linnean Society, June 4.—Dr. D. H. **Scott**, F.R.S., president, in the chair.—Note on the spicules of *Chirodota geminifera*, Dendy and Hindle: Prof. A. **Dendy**. A correction to the paper recently published in the society's journal, *Zoology*, xxx. (1907), pp. 95–124.—The Caryophyllaceæ of Tibet: F. N. **Williams**. The collection was made during the recent military expedition to Lhasa, and it raised the known species to forty-three, from the eleven reported by Messrs. Hemsley and Pearson in the society's journal, *Botany*, xxxv. (1902), pp. 169–170. The route taken by the marching column was virtually unexplored previously, hence the number of novelties, namely, nineteen new species.—*Koonunga cursor*, a remarkable new type of malacostracous Crustacea: O. A. **Sayce**.—The Polychæta of the Indian Ocean: F. A. **Potts**; and the Stylasterina, from the same, elaborated by Dr. S. J. **Hickson** and Miss Helen M. **England**.—A contribution to the mycology of South Africa: W. N. **Cheesman**; with a supplement by T. **Gibbs**.

EDINBURGH.

Royal Society, June 1.—Dr. John Horne, vice-president, in the chair.—Note on some points in the anatomy of a Trilobite, *Calymene blumenbachii*: Dr. Malcolm **Laurie**. The "hypostome" in *Calymene* does not articu-

late with the doublure of the carapace. The margins turn back and articulate about one-third of their length from the front with the inside of the glabella. Movement on this joint draws the front of the hypostome away from the doublure, with which it is connected only by a membrane. There is also a plate articulated by a round joint behind the rostral plate which seems capable of turning into a horizontal position. It becomes a question whether the mouth in this form was in front of or behind the "hypostome."—Experiments with Heusler's magnetic alloy: J. G. **Gray**. The points mainly investigated were the magnetic properties of the alloy between 0° C. and 400° C., and the effects of quenching after heating to high temperatures, and of cooling in liquid air. The effect of the low temperature was to increase the susceptibility. In this respect it resembled Hopkinson's nickel-iron alloy, which begins by being non-magnetic at ordinary temperatures, but becomes magnetic after having been cooled to about –50° C. This result is the more curious inasmuch as Hopkinson's alloy is composed of magnetic materials, but is non-magnetic at the start, whereas Heusler's alloy is magnetic, but is composed of non-magnetic metals.—Note on the electrical resistance of spark gaps: Dr. R. A. **Houston**. The method employed was by use of the resonance curve after the manner introduced by Bjerknes. The resonator was adjustable, and the maximum resonance was detected by means of a galvanometer deflection produced by a thermo-couple, which was heated by the discharge. A deflection was also taken when the resonator had its self-induction slightly altered on each side of the adjustment for the maximum effect. From these and other data the logarithmic decrement of the oscillator can be calculated by means of a formula due to Drude, and thence, knowing the capacity and self-inductance, we can estimate the resistance of the spark gap. Results were obtained for different materials of the electrodes (zinc, aluminium, cadmium, tin, iron, &c.), and for various lengths of spark gap. These were somewhat irregular, but in the case of nickel and aluminium increase in length of spark caused a striking decrease in the decrement.—Treatment of aneurism by electrolysis: Dr. Dawson **Turner**. The many attempts to utilise electrolysis in aneurisms have been made in the hope that clotting might occur round the pole and thus serve as a nucleus for further coagulation and deposits of fibrin, with partial filling of the aneurism cavity. The experiments showed that silver and platinum, which have been mostly used by surgeons, had no action of the kind desired, and, besides, gave off gas bubbles in quantity. There is similarly no advantage in using iron or nickel, for no precipitates are formed. Lead, copper, and zinc, however, all produce precipitates, and of these zinc is to be preferred, both because of the character of the precipitate and because of the complete absence of gas bubbles.—Dr. Dawson **Turner** also exhibited some of Prof. Leduc's photographs of growth due to osmosis, and the microscopic structure of such growth.—The "negative viscosity" of aqueous solutions: Dr. W. W. **Taylor** and T. W. **Moore**. The results brought forward in this paper proved the insufficiency of any of the recognised explanations of this phenomenon.

PARIS.

Academy of Sciences, June 16.—M. H. **Becquerel** in the chair.—A partial differential equation relating to a closed surface: Emile **Picard**.—Researches on the rotation and lustre of the various atmospheric layers of the sun: H. **Deslandres**. A description of a modification of the method given in 1902 for the study of the rotation of the planets, and now applied to the sun. Instead of rotating the spectroscope, which becomes inconvenient with the large dispersion possible for the solar rays, the image of the sun upon the slit is inverted by a suitably mounted prism. The results of comparisons of the iron and cobalt lines (λ 3935.96 and λ 3936.12) and the calcium line K_2 , lead to the conclusion that the upper layers of the solar atmosphere vary considerably in the velocity of rotation, and these may be different in the two hemispheres.—The organs and mode of vegetation of the Neuropteridæ and other Pteridosperms: M. **Grand'Eury**.—The ninth campaign of the *Princesse Alice*: the **Prince of Monaco**. This voyage in the Arctic regions lasted from June 16 to September 12, 1907, and was much hindered by unusual

quantities of ice and by fog. Work was done in the fields of meteorology, oceanography, geography, zoology, and physics. A curious fact with regard to Lumière autochrome plates is noted. Commencing at about latitude $69^{\circ} 40' N.$, a blue veil appeared on the plates, increasing in intensity with the progress north up to the highest point reached, $79^{\circ} N.$ The inverse effect was noted on the return south.—Bilinear forms: **M. de Séguier**.—The partial differential equation of vibrating membranes: **S. Sanielevici**.—The flocculi of hydrogen photographed with the rays $H\alpha$ and $H\delta$: **G. A. Hale**. The flocculi appear to move less rapidly than the gaseous atmosphere in which they float.—The apparent dispersion of light in interstellar space: **Pierre Lebedew**. The experimental results on variable stars obtained by **Ch. Nordmann**, and confirmed by **G. Tikhoff**, have been explained by these authors by the hypothesis that light undergoes a dispersion in interstellar space comparable with the dispersion in air at a pressure of 7mm. at $0^{\circ} C.$ In the present paper this hypothesis is shown to be improbable and unnecessary.—An arrangement for the study of the sensitiveness of electrolytic detectors: **P. Jégou**. The method described does not require the mental comparison of the loudness of a sound heard in the telephone with a sound previously heard under another set of conditions. The instrument figured gives readings on an arbitrary scale corresponding to no sound in the telephone. The apparatus has been applied to study the effect of temperature on the sensitiveness of the electrolytic detector.—The photography of speech: **M. Devaux-Charbonnel**. A microphone is placed in series with a battery and an oscillograph, and the movements of the latter photographed. A study of the vowels showed that the curves are always the same for each, provided that care be taken to pronounce them in the same manner. This condition was easy to fulfil for I and U, more difficult for A, O, E, and most difficult for the mute E.—The ultimate rays of the metalloids: tellurium, phosphorus, carbon, silicon, and boron: **A. de Gramont**.—Researches on the solubility of silver iodide in ammonia: **H. Baubigny**. In previous determinations of this constant sufficient care has not been taken to define the temperature and the strength of the ammonia. At 16° , in ammonia of density 0.926, the solubility is of the order of 1/6000, or less than half the solubility usually accepted.—Ammoniacal chloride of arsenic: **MM. Besson and Rosset**. The composition of the compound formed by the action of ammonia on $AsCl_3$ is held to be $AsCl_3 \cdot 4NH_3$. The products separated by **M. Hugo** by the action of liquid ammonia do not correspond to the original compound, the liquid ammonia behaving rather as a reagent than as a solvent.—The alkaline chloroiridates and chloroiridites: **Marcel Delépine**.—The hydrates of the phosphoric acids: **H. Giran**.—The hydrates of the fatty acids: **D. E. Tsakalotos**.—Colloidal barium sulphate: **A. Recoura**. A solution of sulphuric acid in pure glycerol is neutralised with barium ethylate. The liquid remains limpid, and diluted with ten times its volume of water gives a colloidal solution of barium sulphate, without any precipitation taking place. Solutions of metallic salts, with the exception of mercuric chloride and salts of barium, determine the precipitation of the sulphate.—Constitution of the tetramethyldiaminobenzhydrylmethylene compounds. The replacement of the hydroxyl of Michler's hydrol by the alkylmethylene residues: **R. Fosse**.—The action of alkalis on mono- and di-methylarsinic acids and on their iodo-substituted derivatives: **M. Auger**.—The lactone of 3:4-dioxybutyric acid: **P. Carré**. Details are given of the most advantageous method of preparing the dioxybutyric acid from monochlorohydrin, and of the isolation of the lactone.—The double phosphate of magnesia and monomethylamine: **Maurice François**. Magnesium phosphate cannot be employed to separate ammonia from methylamine, since the latter forms a double phosphate analogous to the ammonio-phosphate. Magnesium phosphate in excess can be used to separate ammonia or methylamine from di- and tri-methylamine.—A modification of the properties of gluten in presence of sulphurous acid: **J. Dugast**.—The increase of the vital capacity and thoracic perimeter in children: **M. Marage**. A set of respiratory movements was taken by the children for five minutes twice daily. The beneficial effects were very marked, and

are set out in tabular form.—The action of the zinc ion in microbial media: **Joseph Mendel**.—Contribution to the study of the constitution of proteid materials. A new method of hydrolysis with hydrofluoric acid: **L. Hugonienq** and **A. Morel**. Hydrofluoric acid at 20 per cent. strength, and at the temperature of the water bath, possesses many advantages as a reagent for the hydrolysis of proteid materials. It gives a complete hydrolysis, and causes less secondary changes than the reagents at present used.—Researches on the hybrids of barley: **L. Blaringhem**.—The hovering of birds: **P. Amans**.—Reply of **M. Marcel Deprez** to the criticism in the preceding note.

DIARY OF SOCIETIES.

THURSDAY, JUNE 25.

ROYAL SOCIETY, at 4.30.—Have Trypanosomes an Ultra-microscopical Stage in their Life-history? Colonel D. Bruce, C.B., F.R.S., and Captain H. R. Bateman.—A Search for Possible New Members of the Inactive Series of Gases (Introductory Note to the Papers by Mr. H. E. Watson and Prof. R. B. Moore): Sir William Ramsay, K.C.B., F.R.S.—A Further Investigation of the Lighter Constituents of the Atmosphere: H. E. Watson.—An Investigation of the Heavier Constituents of the Atmosphere: Prof. R. B. Moore.—On the Atomic Weight of Chlorine: Dr. E. C. Edgar.—Note on the Vapour Pressure and Osmotic Pressure of a Volatile Solute: Prof. H. L. Callendar, F.R.S.—Eutectics Research No. 1, Alloys of Lead and Tin: W. Rosenhain and P. A. Tucker.—The Emission and Transmission of Röntgen Rays: G. W. C. Kaye.—Further Note on a Luminous Glow generated by Electrostatic Induction in an Exhausted Vessel made of Silica: Rev. F. J. Jervis-Smith, F.R.S.—The Action of Chlorine upon Urea whereby a Dichloro Urea is Produced: Dr. F. D. Chattaway, F.R.S.—On the Reflection of Waves from a Stratum of Gradually Varying Properties, with Application to Sound: Dr. J. W. Nicholson.—Preliminary Account of the Habits and Structure of the Anaspididae, with Remarks on some other Freshwater Crustacea from Tasmania: Geoffrey Smith.—The ψ -Functions—A Class of Normal Functions: E. Cunningham.—And other papers.

MONDAY, JUNE 29.

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—Some Aspects of the Nile Valley: Capt. H. G. Lyons, F.R.S.

WEDNESDAY, JULY 1.

BRITISH ASTRONOMICAL ASSOCIATION, at 5.

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